WHAT IS CLAIMED IS:

1. An image forming apparatus that forms an electrostatic latent image on a medium to be scanned by laser beams, which are projected from a plurality of laser light sources and periodically deflected by a rotational deflecting unit, so that the laser beams scan the medium, which is uniformly charged and moving in a sub-scanning direction, in a main-scanning direction perpendicular to the sub-scanning direction, the image forming apparatus comprising:

a pixel clock generating unit that generates pixel clocks, which are used for controlling timings of projection of said laser beams, separately for each of said laser light sources, and for performing a phase change of each of said pixel clocks; and

a phase control unit that controls independently each of said pixel clocks.

2. The image forming apparatus as claimed in claim 1, wherein said phase control unit generates control pulse signals for controlling the phase change of the pixel clocks generated by said pixel clock generation means, respectively, and outputs the control pulse signals to said pixel clock generation means, and said pixel clock generating unit performs the phase change of said pixel clocks when said control pulse signals are supplied thereto.

3. The image forming apparatus as claimed in claim 2, further comprising an operation unit that inputs setting values, which indicate an interval and a number of pulses of said control pulse signals for each of said laser light sources, wherein said phase control unit generates said control pulse signals of said pixel clocks, respectively, based on the setting values input by said operation unit, and outputs said control pulse signals to said pixel clock generating unit.

4. The image forming apparatus as claimed in claim 2, further comprising:

an operation unit that inputs setting values, which indicate an interval and a number of pulses of said control pulse signals for performing the phase change on one of said laser light sources; and

a setting value computing units that computes setting values for other laser light sources other than said one of the laser light sources by adding values, which is previously specified for each of said other laser light sources, to the setting values for said one of the laser light sources input by said operation unit,

wherein said phase control unit generates and outputs the control pulse signals corresponding to the respective laser light sources based on the setting values input by said operation means and the setting values computed by said setting value computing unit.

5. The image forming apparatus as claimed in claim 3, further comprising a synchronization detection unit that detects the laser beams from said laser light

sources at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction and for outputting a synchronization detection signals, which specify scan start positions of said laser beams in the main-scanning direction, respectively,

wherein said pixel clock generating unit generates said pixel clocks in synchronization with said synchronization detection signals.

6. The image forming apparatus as claimed in claim 2, further comprising:

a synchronization detection unit that detects the laser beams from said laser light sources at positions outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction, said synchronization detection unit including a first synchronization detection unit and a second synchronization detection unit located opposite to the first synchronization detection unit with respect to said image formation area;

a scan time measuring unit that measures a scan time after said first synchronization detection unit detects the laser beam until said second synchronization detection unit detects the laser beam on an individual laser light source basis; and

a scan time comparison unit that compares the scan time of each of the laser light sources measured by said scan time measuring unit with a value indicating a reference of the scan time so as to compute setting values based on a result of the comparison, the setting values indicating an interval and a number of pulses of each of the control pulse signals,

wherein said phase control unit generates and outputs the control pulse signals corresponding to the respective laser light sources base on the setting values computed by said scan time comparison unit.

7. The image forming apparatus as claimed in claim 6, wherein said scan time comparison unit computes a number of pulses to be increased or decreased with respect to each of said control pulse signals by multiplying a value, which is obtained by subtracting

said reference of the scan time from the measured scan time, by a period of a respective one of said pixel clocks and dividing the multiplied value by a time unit of the phase change.

8. The image forming apparatus as claimed in claim 6, wherein said synchronization detection unit detects the laser beams from said laser light sources, respectively, at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction so as to output synchronization detection signals, which specify scan start positions of the respective laser beams in the main-scanning direction, and said pixel clock generating unit generates said pixel clocks in synchronization with said synchronization detection signals.

9. The image forming apparatus as claimed in

claim 2, further comprising:

a synchronization detection unit that detects the laser beams from said laser light sources at positions outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction, said synchronization detection unit including a first synchronization detection unit and a second synchronization detection unit located opposite to the first synchronization detection unit with respect to said image formation area;

a scan time measuring unit that measures a scan time after said first synchronization detection unit detects the laser beam until said second synchronization detection unit detects the laser beam on an individual laser light source basis; and

a scan time comparison unit that compares the scan time of each of the laser light sources measured by said scan time measuring unit with a value indicating a reference of the scan time so as to compute setting values for said one of said laser light sources based on a result of the comparison, the setting values indicating an interval and a number of pulses of the control pulse signal of said one of said laser light sources; and

a setting value computing unit that computes each of said setting values of said other laser light sources by adding setting values, which is previously specified for each of said other laser light sources, to the setting values for said one of said laser light sources,

wherein said phase control unit outputs the control pulse signals corresponding to said other laser light sources base on the setting values computed by said setting value computing unit.

10. The image forming apparatus as claimed in claim 9, wherein said scan time comparison unit computes a number of pulses to be increased or decreased with respect to each of said control pulse signals by multiplying a value, which is obtained by subtracting said reference of the scan time from the measured scan time, by a period of a respective one of said pixel clocks and dividing the multiplied value by a time unit of the phase change.

11. The image forming apparatus as claimed in claim 9, wherein said synchronization detection unit detects the laser beams from said laser light sources, respectively, at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction so as to output synchronization detection signals, which specify scan start positions of the respective laser beams in the main-scanning direction, and said pixel clock generating unit generates said pixel clocks in synchronization with said synchronization detection signals.

12. The image forming apparatus as claimed in claim 1, wherein said phase control unit controls a phase of each of said pixel clocks so that the phase is changed by a time unit shorter than a period of each of said pixel clocks.

13. The image forming apparatus as claimed in claim 1, wherein said phase control unit varies an output timing of said control pulse signals for each scan period.

14. The image forming apparatus as claimed in claim 13, wherein said phase control unit varies the output timing of said control pulse signals by a fixed unit time each time when one scan period has passed.

15. The image forming apparatus as claimed in claim 14, wherein said phase control unit varies the output timing of said control pulse signals based on said unit time that is obtained as a product of a value, which is obtained by subtracting a product of the interval of pulses and the number of pulses of each of said control signal pulses from the scan period, and a

product of a fractional number having a numerator of a positive integer and a denominator of a positive integer, and wherein the output timing of said control pulse signals after change matches the output timing before change for the number of the denominator.

16. The image forming apparatus as claimed in claim 1, wherein said phase control unit varies a phase of each of said pixel clocks for each divided period obtained by dividing one scan period of each of said laser light sources.

17. An image forming apparatus that forms an electrostatic latent image on a medium to be scanned by laser beams, which are projected from a plurality of laser light sources and periodically deflected by a rotational deflecting unit, so that the laser beams scan the medium, which is uniformly charged and moving in a sub-scanning direction, in a main-scanning direction

perpendicular to the sub-scanning direction, the image forming apparatus comprising:

a pixel clock generating unit that generates pixel clocks for performing independently a modulation control of each of said laser light sources, and changes independently a phase of each of said pixel clocks of said laser light sources based on control pulse signals supplied thereto.

18. The image forming apparatus as claimed in claim 17, further comprising a synchronization detection unit that detects the laser beams from said laser light sources at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction and for outputting a synchronization detection signals, which specify scan start positions of said laser beams in the main-scanning direction, respectively,

wherein said pixel clock generating unit generates said pixel clocks in synchronization with said synchronization detection signals.

19. An optical scanning apparatus as claimed in claim 18, wherein said synchronization detection unit detects said laser beams at two positions outside said image formation area in the main-scanning direction, and outputs said synchronization detection signals for measuring a scan time spent on scanning between said two positions.

20. The image forming apparatus as claimed in claim 17, wherein said pixel clock generating unit controls a phase of each of said pixel clocks so that the phase is changed by a time unit shorter than a period of each of said pixel clocks.

21. The image forming apparatus as claimed in claim 17, wherein said pixel clock generating unit

varies an output timing of said control pulse signals for each scan period.

22. The image forming apparatus as claimed in claim 21, wherein said pixel clock generating unit varies the output timing of said control pulse signals by a fixed unit time each time when one scan period has passed.

23. The image forming apparatus as claimed in claim 17, wherein said pixel clock generating unit varies the output timing of said control pulse signals based on said unit time that is obtained as a product of a value, which is obtained by subtracting a product of the interval of pulses and the number of pulses of each of said control signal pulses from the scan period, and a product of a fractional number having a numerator of a positive integer and a denominator of a positive integer, and wherein the output timing of said control pulse

signals after change matches the output timing before change for the number of the denominator.

24. An image forming method that forms an electrostatic latent image on a medium to be scanned by laser beams, which are projected from a plurality of laser light sources and periodically deflected in a rotational deflecting process, so that the laser beams scan the medium, which is uniformly charged and moving in a sub-scanning direction, in a main-scanning direction perpendicular to the sub-scanning direction, the image forming apparatus comprising:

a pixel clock generation step of generating pixel clocks, which are used for controlling timings of projection of said laser beams, separately for each of said laser light sources;

a phase control step of controlling independently a phase control of each of said pixel clocks; and

a phase change step of performing the phase change of each of said pixel clocks in accordance with the phase control step.

25. The image forming method as claimed in claim 24, wherein said phase control step generates control pulse signals for controlling the phase change of the pixel clocks generated in said pixel clock generation step, respectively, and outputs the control pulse signals to said pixel clock generation step, and said pixel clock generation step performs the phase change of said pixel clocks when said control pulse signals are supplied thereto.

26. The image forming method as claimed in claim 25, further comprising an input step of inputting setting values, which indicate an interval and a number of pulses of said control pulse signals for each of said laser light sources, wherein said phase control step generates said control pulse signals of said pixel clocks, respectively, based on the setting values input in said input step, and outputs said control pulse

signals to said pixel clock generation step.

27. The image forming method as claimed in claim 26, further comprising a synchronization detection step of detecting the laser beams from said laser light sources at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction and outputting a synchronization detection signals, which specify scan start positions of said laser beams in the main-scanning direction, respectively,

wherein said pixel clock generation step generates said pixel clocks in synchronization with said synchronization detection signals.

28. The image forming method as claimed in claim 25, further comprising:

an input step of inputting setting values, which indicate an interval and a number of pulses of

said control pulse signals for performing the phase change on one of said laser light sources; and

a setting value computation step of computing setting values for other laser light sources other than said one of the laser light sources by adding values, which is previously specified for each of said other laser light sources, to the setting values for said one of the laser light sources input in said input step,

wherein said phase control step generates and outputs the control pulse signals corresponding to the respective laser light sources based on the setting values input in said input step and the setting values computed in said setting value computation step.

29. The image forming method as claimed in claim 28, further comprising a synchronization detection step of detecting the laser beams from said laser light sources at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction and outputting a synchronization detection signals, which specify scan start positions of said laser beams in the

main-scanning direction, respectively,

wherein said pixel clock generation step generates said pixel clocks in synchronization with said synchronization detection signals.

30. The image forming method as claimed in claim 25, further comprising:

a first synchronization detection step of detecting the laser beams from said laser light sources at a first position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction;

a second synchronization detection step of detecting the laser beams from said laser light sources at a second position outside said image formation area;

a scan time measuring step of measuring a scan time after the laser beam is detected in said first synchronization detection step and until the laser beam is detected in said second synchronization detection step on an individual laser light source basis; and

a scan time comparison step of comparing the scan time of each of the laser light sources measured by

said scan time measuring means with a value indicating a reference of the scan time so as to compute setting values based on a result of the comparison, the setting values indicating an interval and a number of pulses of each of the control pulse signals,

wherein said phase control step generates and outputs the control pulse signals corresponding to the respective laser light sources base on the setting values computed in said scan time comparison step.

31. The image forming method as claimed in claim 30, wherein said scan time comparison step computes a number of pulses to be increased or decreased with respect to each of said control pulse signals by multiplying a value, which is obtained by subtracting said reference of the scan time from the measured scan time, by a period of a respective one of said pixel clocks and dividing the multiplied value by a time unit of the phase change.

32. Then image forming method as claimed in claim 30, wherein said first synchronization detection step detects the laser beams from said laser light sources, respectively, at said first position so as to output synchronization detection signals, which specify scan start positions of the respective laser beams in the main-scanning direction, and said pixel clock generation step generates said pixel clocks in synchronization with said synchronization detection signals.

33. The image forming method as claimed in claim 25, further comprising:

a first synchronization detection step of detecting the laser beams from said laser light sources at a first position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction;

a second synchronization detection step of detecting the laser beams from said laser light sources at a second position outside said image formation area;

a scan time measuring step of measuring a scan time after the laser beam is detected in said first synchronization detection step and until the laser beam is detected in said second synchronization detection step on an individual laser light source basis;

a scan time comparison step of comparing the scan time of each of the laser light sources measured in said scan time measuring step with a value indicating a reference of the scan time so as to compute setting values for said one of said laser light sources based on a result of the comparison, the setting values indicating an interval and a number of pulses of the control pulse signal of said one of said laser light sources; and

a setting value computation step of computing each of said setting values of said other laser light sources by adding setting values, which is previously specified for each of said other laser light sources, to the setting values for said one of said laser light sources,

wherein said phase control step outputs the control pulse signals corresponding to said other laser light sources base on the setting values computed in said setting value computation step.

34. The image forming method as claimed in claim 33, wherein said scan time comparison step computes a number of pulses to be increased or decreased with respect to each of said control pulse signals by multiplying a value, which is obtained by subtracting said reference of the scan time from the measured scan time, by a period of a respective one of said pixel clocks and dividing the multiplied value by a time unit of the phase change.

35. The image forming method as claimed in claim 33, wherein said scan time comparison step computes a number of pulses to be increased or decreased with respect to each of said control pulse signals by multiplying a value, which is obtained by subtracting said reference of the scan time from the measured scan time, by a period of a respective one of said pixel clocks and dividing the multiplied value by a time unit of the phase change.

36. The image forming method as claimed in claim 24, wherein said phase control step controls a phase of each of said pixel clocks so that the phase is changed by a time unit shorter than a period of each of said pixel clocks.

37. The image forming method as claimed in claim 24, wherein said phase control step varies an output timing of said control pulse signals for each scan period.

38. The image forming method as claimed in claim 37, wherein said phase control step varies the output timing of said control pulse signals by a fixed unit time each time when one scan period has passed.

39. The image forming method as claimed in claim 38, wherein said phase control step varies the output timing of said control pulse signals based on said unit time that is obtained as a product of a value, which is obtained by subtracting a product of the interval of pulses and the number of pulses of each of said control signal pulses from the scan period, and a product of a fractional number having a numerator of a positive integer and a denominator of a positive integer, and wherein the output timing of said control pulse signals after change matches the output timing before change for the number of the denominator.

40. The image forming method as claimed in claim 24, wherein said phase change step varies a phase of each of said pixel clocks for each divided period obtained by dividing one scan period of each of said laser light sources.

41. An image forming apparatus that forms an electrostatic latent image on a medium to be scanned by laser beams, which are projected from a plurality of laser light sources and periodically deflected by a rotational deflecting unit, so that the laser beams scan the medium, which is uniformly charged and moving in a sub-scanning direction, in a main-scanning direction perpendicular to the sub-scanning direction, the image forming apparatus comprising:

pixel clock generation means for generating pixel clocks, which are used for controlling timings of projection of said laser beams, separately for each of said laser light sources, and for performing a phase change of each of said pixel clocks; and

phase control means for controlling independently each of said pixel clocks.

42. The image forming apparatus as claimed in

claim 41, wherein said phase control means generates control pulse signals for controlling the phase change of the pixel clocks generated by said pixel clock generation means, respectively, and outputs the control pulse signals to said pixel clock generation means, and said pixel clock generation means performs the phase change of said pixel clocks when said control pulse signals are supplied thereto.

43. The image forming apparatus as claimed in claim 42, further comprising input means for inputting setting values, which indicate an interval and a number of pulses of said control pulse signals for each of said laser light sources, wherein said phase control means generates said control pulse signals of said pixel clocks, respectively, based on the setting values input by said input means, and outputs said control pulse signals to said pixel clock generation means.

44. The image forming apparatus as claimed in claim 42, further comprising:

input means for inputting setting values, which indicate an interval and a number of pulses of said control pulse signals for performing the phase change on one of said laser light sources; and

setting value computation means for computing setting values for other laser light sources other than said one of the laser light sources by adding values, which is previously specified for each of said other laser light sources, to the setting values for said one of the laser light sources input by said input means,

wherein said phase control means generates and outputs the control pulse signals corresponding to the respective laser light sources based on the setting values input by said input means and the setting values computed by said setting value computation means.

45. The image forming apparatus as claimed in claim 43, further comprising synchronization detection means for detecting the laser beams from said laser light sources at a position outside an image formation

area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction and for outputting a synchronization detection signals, which specify scan start positions of said laser beams in the main-scanning direction, respectively,

wherein said pixel clock generation means generates said pixel clocks in synchronization with said synchronization detection signals.

46. The image forming apparatus as claimed in claim 42, further comprising:

synchronization detection means for detecting the laser beams from said laser light sources at positions outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction, said synchronization detection means including a first synchronization detection unit and a second synchronization detection unit located opposite to the first synchronization detection unit with respect to said image formation area;

scan time measuring means for measuring a scan

time after said first synchronization detection unit detects the laser beam until said second synchronization detection unit detects the laser beam on an individual laser light source basis; and

scan time comparison means for comparing the scan time of each of the laser light sources measured by said scan time measuring means with a value indicating a reference of the scan time so as to compute setting values based on a result of the comparison, the setting values indicating an interval and a number of pulses of each of the control pulse signals,

wherein said phase control means generates and outputs the control pulse signals corresponding to the respective laser light sources base on the setting values computed by said scan time comparison means.

47. The image forming apparatus as claimed in claim 46, wherein said scan time comparison means computes a number of pulses to be increased or decreased with respect to each of said control pulse signals by multiplying a value, which is obtained by subtracting said reference of the scan time from the measured scan

time, by a period of a respective one of said pixel clocks and dividing the multiplied value by a time unit of the phase change.

48. The image forming apparatus as claimed in claim 46, wherein said synchronization detection means detects the laser beams from said laser light sources, respectively, at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction so as to output synchronization detection signals, which specify scan start positions of the respective laser beams in the main-scanning direction, and said pixel clock generation means generates said pixel clocks in synchronization with said synchronization detection signals.

49. The image forming apparatus as claimed in claim 42, further comprising:

synchronization detection means for detecting the laser beams from said laser light sources at positions outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction, said synchronization detection means including a first synchronization detection unit and a second synchronization detection unit located opposite to the first synchronization detection unit with respect to said image formation area;

scan time measuring means for measuring a scan time after said first synchronization detection unit detects the laser beam until said second synchronization detection unit detects the laser beam on an individual laser light source basis; and

scan time comparison means for comparing the scan time of each of the laser light sources measured by said scan time measuring unit with a value indicating a reference of the scan time so as to compute setting values for said one of said laser light sources based on a result of the comparison, the setting values indicating an interval and a number of pulses of the control pulse signal of said one of said laser light sources; and

setting value computation means for computing

each of said setting values of said other laser light sources by adding setting values, which is previously specified for each of said other laser light sources, to the setting values for said one of said laser light sources,

wherein said phase control means outputs the control pulse signals corresponding to said other laser light sources base on the setting values computed by said setting value computation means.

50. The image forming apparatus as claimed in claim 49, wherein said scan time comparison means computes a number of pulses to be increased or decreased with respect to each of said control pulse signals by multiplying a value, which is obtained by subtracting said reference of the scan time from the measured scan time, by a period of a respective one of said pixel clocks and dividing the multiplied value by a time unit of the phase change.

51. The image forming apparatus as claimed in claim 49, wherein said synchronization detection means detects the laser beams from said laser light sources, respectively, at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction so as to output synchronization detection signals, which specify scan start positions of the respective laser beams in the main-scanning direction, and said pixel clock generation means generates said pixel clocks in synchronization with said synchronization detection signals.

52. The image forming apparatus as claimed in claim 41, wherein said phase control means controls a phase of each of said pixel clocks so that the phase is changed by a time unit shorter than a period of each of said pixel clocks.

53. The image forming apparatus as claimed in claim 41, wherein said phase control means varies an output timing of said control pulse signals for each scan period.

54. The image forming apparatus as claimed in claim 53, wherein said phase control means varies the output timing of said control pulse signals by a fixed unit time each time when one scan period has passed.

55. The image forming apparatus as claimed in claim 54, wherein said phase control means varies the output timing of said control pulse signals based on said unit time that is obtained as a product of a value, which is obtained by subtracting a product of the interval of pulses and the number of pulses of each of said control signal pulses from the scan period, and a product of a fractional number having a numerator of a

positive integer and a denominator of a positive integer, and wherein the output timing of said control pulse signals after change matches the output timing before change for the number of the denominator.

56. The image forming apparatus as claimed in claim 51, wherein said phase change means varies a phase of each of said pixel clocks for each divided period obtained by dividing one scan period of each of said laser light sources.

57. An image forming apparatus that forms an electrostatic latent image on a medium to be scanned by laser beams, which are projected from a plurality of laser light sources and periodically deflected by a rotational deflecting unit, so that the laser beams scan the medium, which is uniformly charged and moving in a sub-scanning direction, in a main-scanning direction perpendicular to the sub-scanning direction, the image

forming apparatus comprising:

pixel clock generation means for generating pixel clocks for performing independently a modulation control of each of said laser light sources, and for changing independently a phase of each of said pixel clocks of said laser light sources based on control pulse signals supplied thereto.

58. The image forming apparatus as claimed in claim 57, further comprising synchronization detection means for detecting the laser beams from said laser light sources at a position outside an image formation area where the electrostatic latent image is formed on said medium to be scanned in the main-scanning direction and for outputting a synchronization detection signals, which specify scan start positions of said laser beams in the main-scanning direction, respectively,

wherein said pixel clock generation means generates said pixel clocks in synchronization with said synchronization detection signals.

59. An optical scanning apparatus as claimed in claim 58, wherein said synchronization detection means detects said laser beams at two positions outside said image formation area in the main-scanning direction, and outputs said synchronization detection signals for measuring a scan time spent on scanning between said two positions.

60. The image forming apparatus as claimed in claim 57, wherein said pixel clock generation means controls a phase of each of said pixel clocks so that the phase is changed by a time unit shorter than a period of each of said pixel clocks.

61. The image forming apparatus as claimed in claim 57, wherein said pixel clock generation means varies an output timing of said control pulse signals

for each scan period.

62. The image forming apparatus as claimed in claim 61, wherein said pixel clock generation means varies the output timing of said control pulse signals by a fixed unit time each time when one scan period has passed.

63. The image forming apparatus as claimed in claim 57, wherein said pixel clock generation means varies the output timing of said control pulse signals based on said unit time that is obtained as a product of a value, which is obtained by subtracting a product of the interval of pulses and the number of pulses of each of said control signal pulses from the scan period, and a product of a fractional number having a numerator of a positive integer and a denominator of a positive integer, and wherein the output timing of said control pulse signals after change matches the output timing before

change for the number of the denominator.